

Remarks

Claims 1-38 are pending in the application. Applicants gratefully acknowledge the Examiners reconsideration and withdrawal of the specification objections and claims objections.

Claims 1-38 are rejected as follows:

Claim Rejections 35 U.S.C. § 102

The following anticipation rejections were asserted in the Office Action:

- (i) Claims 1, 2, 7, 9 and 10 stand rejected as being anticipated by U.S. Patent No. 5,410,749 to Siwiak et al.;
- (ii) Claims 1, 11, 12, 22, 23 and 24 stand rejected as being anticipated by U.S. Patent No. 5,903,239 to Takahashi, et. al.;
- (iii) Claims 1, 4, 5, 12-20, 23, 25, 26-33 and 34-38 stand rejected as being anticipated by U.S. Patent No. 5,400,039 to Araki, et. al.; and
- (iv) Claims 1-3 and 7-10 stand rejected as being anticipated by U.S. Patent No. 6,809,689 to Chen.

Claim Rejections 35 U.S.C. § 103

Claims 6 and 21 stand rejected under 35 U.S.C 103(a) as being unpatentable over Takahashi in view of the ARRL antenna handbook

Applicants respectfully traverse the claim rejections and maintain that none of the cited references discloses or suggests, e.g., an antenna device formed having a *conductive via stub as a radiating element*, as essentially claimed in claims 1, 12, 26 and 34. As previously explained, and as will be reiterated below, while some or all of the cited references arguably disclose antenna systems/devices that include *conductive via stubs*, such via stubs are merely used as

electrical interconnects, or antenna feeds, etc. Applicants respectfully submit that none of the references suggest using conductive via stubs as antenna radiating elements that are designed to resonate at certain frequencies for radiating/receiving EM energy.

Examiner's Response to Arguments

The crux of the claim rejections is seemingly clarified in the Examiner's response to arguments on page 6 of the Final Action where the Examiner essentially contends that by Applicants own teachings and admission, *conductive via stub radiating elements* encompasses *via stub feeding elements*. In other words, on a more general note, the Examiner seems to suggest that Applicants' specification teaches that antenna feed elements (feeding via stubs) are properly characterized as antenna radiating elements (radiating via stubs). To support this finding, the Examiner relies on FIG. 5 of Applicant's specification and the following corresponding text in paragraph [0064] of Applicants' published application US 2005/0122265, which states, in part:

The radiating elements of the antenna (50) comprise a first conductive via (54) and a second conductive via (55) formed in the substrate (51) and a top element (56) (metallic strip) that connects to the first and second vias (54) and (55).

Even assuming *arguendo* that the above sentence, when viewed in isolation, seems to characterize the second conductive via (55) as an antenna radiating element, the Examiner's reliance in this regard is respectfully misplaced. It is axiomatic that when evaluating claims, the Examiner must interpret the claims with the broadest *reasonable* interpretation that is consistent with the specification and the Examiner cannot interpret the claim language in a vacuum, but rather the claims should be interpreted in view of the specification as it would be interpreted by one of ordinary skill in the art. See, In re Sneed, 710 F.2d 1544, 1548, 218 USPQ 385, 388 (Fed.

Cir. 1983); In re Bond, 910 F.2d 831, 833, 15 USPQ2d 1566, 1567 (Fed. Cir. 1990); In re Morris, 127 F.3d 1048, 1054, 44 USPQ2d 1023, 1027 (Fed. Cir. 1997).

Moreover, the claim terms should be given their broadest reasonable meaning in their ordinary usage as such claim terms would be understood by one of ordinary skill in the art, taking into consideration the meanings of such claim terms by way of definitions or otherwise that may be afforded by the written description contained in the appellant's specification. In re Morris, 127 F.3d 1048, 1054, 44 USPQ2d 1023, 1027 (Fed. Cir. 1997). Claim terms are presumed to have the ordinary and customary meanings attributed to them by those of ordinary skill in the art. Sunrace Roots Enter. Co. v. SRAM Corp., 336 F.3d 1298, 1302, 67 USPQ2d 1438, 1441 (Fed. Cir. 2003); Brookhill-Wilk I, LLC v. Intuitive Surgical, Inc., 334 F.3d 1294, 1298, 67 USPQ2d 1132, 1136 (Fed. Cir. 2003)("In the absence of an express intent to impart a novel meaning to the claim terms, the words are presumed to take on the ordinary and customary meanings attributed to them by those of ordinary skill in the art.").

Here, it is respectfully submitted that Examiner's interpretation of the claim language *conductive via stub as a radiating element* as broadly encompassing *a conductive via stub as an antenna feed element*, is improper as a matter of fact and law. In particular, the Examiner focuses too narrowly on one sentence in Applicants' specification, and fails to consider Applicants' specification as a whole. For example, Applicants teach in the same paragraph [0064] that the second conductive via (55) is used for feeding the antenna, wherein the antenna in FIG. 5 has a well known structure, INF, inverted-F antenna having a bent radiating element formed by elements (54) and (56) connected to ground (52a) and a feed element (55) connected to the radiating element at some length along the element (56). Moreover, Claim 17 recites

wherein the insulation layer comprises a feeding via formed therein, wherein the feeding via provides a connection to the radiating element of the antenna.

Applicants' specification is replete with disclosure in which clear distinctions are made between antenna feed elements and antenna radiator elements. Moreover, Applicants provide detailed explanations regarding methods and techniques and considerations for constructing conductive via stubs in substrates to serve as antenna radiator elements (see, e.g., para. [0028~0050]). Applicants' specification does not make specific reference to feed elements as being the same, similar or otherwise analogous to radiating elements. In view of this, at the very least, it is reasonable to find that the above statement “ **The radiating elements of the antenna (50)** ... as relied on by the Examiner may contain a misstatement regarding the term “radiating elements of the antenna (50)” which may have been intended to read as “The elements of the antenna (50).”

Moreover, given the Examiner's experience and knowledge in this art, it seems that the Examiner should well recognize that the terms “antenna feeds” and “antenna radiators” , for example, are well-known terms of art that are widely used to distinguish between components of an antenna system. At the very least, the cited art of record relied on by the Examiner use the terms “antenna feed” and “antenna radiator” (or “radiating element”) to describe different components in an antenna system. In this regard, the Examiner's characterization of the claim term “*conductive via stub is a radiating element*” as recited in claims 1, 12, 26 and 34, for example, as being met by disclosure of *conductive via stub as a feed element or interconnect* in the cited references is a stark departure from, and ignores, the common usage of the terms “antenna feed and antenna radiating element, as would be understood by one of ordinary skill in

the art of the invention, and results in a large inconsistency between the Examiner's interpretation of the references and what the references clearly teach.

(1) Siwiak

For example, the Examiner contends that Siwiak discloses *a conductive via stub formed in the substrate, wherein the conductive via stub is a radiating element* by virtue of a radiating element (hat element) (302) formed on one end of a conductive via stub (i.e., feeders, 308, 310 extending through apertures 316, 312, etc.) (see page 2, para. 2 of the Final Action). It is respectfully submitted that this characterization is flawed for several reasons.

First, for those reasons noted above, there is no basis for the Examiner's interpretation of the first and second feeders (308) and (310) in FIG. 2 of Siwiak as being radiators. Indeed, Siwiak clearly teaches that the feeders (308) and (310) serve to couple signals that are received by the planar antenna element (302) to receiver element circuits (328, 326) (see, Col. 3, lines 55-65). Moreover, Siwiak makes the clear distinction between a "planar antenna element" (radiator) and a "feeder system" coupled to the planar antenna element (see, e.g., Claim 1, Col. 9), where the feeder system is the feeder elements (308, 310). In this regard, there is nothing in Siwiak that supports the Examiner's characterization of the feeder elements (308, 310) as being *conductive via radiators*, as contemplated by the claimed inventions.

In fact, the Examiner's characterization of the feeder elements (308, 310) as being conductive vias is seemingly incorrect. Indeed, the feeders (308, 310) appear to be nothing more than metallic wires that pass through apertures (312, 316) in the substrate (314) (see, Col. 4, lines 55-60). In this regard, the feeders (308, 310) are not even conductive vias that are formed in a substrate, as contemplated by the claimed inventions.

Accordingly, claims 1, 2, 7, 9 and 10 are not anticipated by Siwiak

(2) **Takahashi**

The Examiner relies on FIGs. 3 and 8 Takahashi as teaching a radiating element (hat element) (i.e., microstrip patch antenna 10, 19) comprising a conductive via stub (i.e., through hole 11) formed in a substrate (9) (see, p. 3, para. 3 of the Final Action). Apparently, the Examiner construes the “through-hole (11) illustrated in FIGs. 3 and 8 as being the claimed *conductive via stub formed in the substrate, wherein the conductive via stub is a radiating element*.”

However, Takahashi clearly characterizes the microstrip patch antenna (10) as the radiating element that receives radio waves, which are feed to a detection circuit through the through hole (11), feeding terminal (12), etc. (See, Col. 4, lines 19-31) and refers to the “radiating efficiency” of the antenna (10) (see, Col. 4, lines 29-31). In this regard, the teachings of Takahashi are opposite and do not support the Examiner’s characterization of the through hole (11) as being a *conductive via radiator*, as contemplated by the claimed inventions. In fact, in FIG. 3, it is clear that the through hole (11) is simply part of a feed network including the feed terminal (12) and microstrip line (7) to a chip (52) (Col. 4, lines 19-25).

Accordingly, claims 1, 11, 12, 22, 23 and 24 are not anticipated by Takahashi

(3) **Araki**

The Examiner contends on page 4 of the Final Action that Araki teaches at least one radiating element (i.e., radiator 22, 23, 24 as form of a hat element) comprising a conductive via stub (i.e., via conductor 2a as a form of feeding via to provide a connection to the antenna) formed in the substrate (i.e., dielectric layers 4, 6, 14).

Araki is yet another reference that illustrates the common usage of terms such as antenna radiators and antenna feeds to describe separate and distinct components of an antenna system which serve different purposes. In fact, in formulating the rejection, the Examiner even admits that the conductive via 2a is merely a feeding via to provide a connection to antenna radiator 22, 23 34. In this regard, it is seemingly improper as a matter of law for the Examiner to construe the feeding vias (2a) as antenna radiators when such interpretation is not supported by, but clearly inconsistent with, the explicit teachings of Araki.

Accordingly, claims 1, 4, 5, 12-20, 23, 25, 26-33 and 34-38 are not anticipated by Araki,

(4) Chen

The Examiner contends on page 5 of the Final Action that Chen discloses a radiating element (2) formed on the end of a conductive stub (13, 14). Again, Chen merely discloses that the conductive vias (13, 14) are used to form connections between antenna components, but Chen does not teach or suggest that the conductive vias (13, 14) are radiators. In fact, Chen teaches that it is the conductive layer (3) and radiating element (2) which generate high frequency resonance so as to radiate/receive an EM wave with a quarter-wavelength (see, Col. 3, lines 49-61), and that the conductive vias (13, 14) merely serve as interconnects (see, e.g., Claim 6 on Col. 4, lines 52-58). Chen is yet another reference that illustrates a common usage and understanding of what is meant by antenna radiators (e.g., receive/radiate EM energy for given resonant frequency), which is inconsistent with the Examiner's findings..

Accordingly, claims 1, 12, 26 and 34 are not anticipated by any of the above cited references. Moreover, at the very least, the dependent claims are patentable over the cited references at least by virtue of their dependence from respective base claims 1, 12, 26 or 34. Moreover, claims 6 and 21 are patentable and non obvious over the combination of Takahashi

and ARRL at least by virtue of their dependence from respective base claims 1 and 12 because such combination does *not* teach or suggest *an antenna having a conductive via stub that is a radiating element*. Therefore, withdrawal of the rejections is requested.

Respectfully submitted,



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